

REMARKS

Pursuant to 37 CFR 1.111, reconsideration of the Official Action dated April 27, 1995 is respectfully requested.

Relying on 35 U.S.C. §112, first paragraph, the Examiner has rejected the claims for the reasons discussed at page 2 of the Official Action. In response to the Examiner's helpful suggestion, claim 11 has been amended to delete the language to which the Examiner objects, and substitute therefor 1,3-dichloro-1-fluorobutane, mentioned in the specification at page 3, lines 22 to 24. The temperature range of "between 80° and 110°C" is found in the specification at page 8, lines 9 and 10, and "at least 55% by weight of solvent" is found in the specification in the paragraphs spanning pages 3 and 4, especially page 3, line 38. In view of the above amendments, applicants respectfully submit that the claims now fully comply with the requirements of Section 112, first paragraph. Applicants therefore respectfully request the Examiner to reconsider and withdraw the rejection of the claims under Section 112, first paragraph.

Relying on 35 U.S.C. §103, the Examiner has rejected the claims, alleging the subject matter thereof would have been obvious to a person of ordinary skill in the art in view of the disclosures of U.S. Patent 5,008,747 to Walraevens

considered together with International Publication No. WO 89/12614 by Rao. Applicants respectfully traverse the Examiner's rejection, and request reconsideration. In the paragraph spanning pages 2 and 3 of the Official Action the Examiner alleges that no objective evidence has been submitted that the problem solved by the invention "exists or is solved by the present invention." The Examiner's attention is respectfully directed to comparative Examples 1, 2, and 4 at pages 9 to 11 of the present specification. These Examples are clearly **evidence** of the formation of large amounts of heavy by-products and the reaction between vinyl chloride and HF. As the Examiner will note, from 25 to 46% of the vinyl chloride is converted in these conditions into heavy side products.

Furthermore, Examples 3 and 5 to 9, according to the invention, are further **evidence** that the present invention limits the formation of heavy-by-products to reasonable amounts. In these Examples a maximum of 13% of vinyl chloride is converted into heavy side products (see Example 10). Clearly this means that the formation of heavy side products is reduced by at least half over the previously known process for preparing 1-chloro-1-fluoroethane and/or 1,1-difluoroethane starting from vinyl chloride. In this respect, the Examiner is respectfully requested to compare the worst Example according to the present invention (Example

10) with the "best" comparative Example (Example 4). Applicants therefore respectfully submit that there is **evidence of record** that the problem solved by the present invention exists and is solved "by the present invention."

The Examiner has also alleged that there is no objective evidence that "the analogous starting material of the primary reference" would behave differently in "the same chemical process." The tests reported at pages 1 and 2 of the Declaration under 37 CFR 1.132 filed March 24, 1995 are clearly **evidence** that vinylidene chloride and vinyl chloride behave differently when reacted with HF in similar conditions, either in the presence or absence of a catalyst. Moreover, the replacement of the starting material in a given chemical process inevitably modifies the process. It is thus not possible to test vinyl chloride and vinylidene chloride in the "same" chemical process. It is therefore clear that objective evidence has been submitted that the "analogous starting material of the primary reference" does behave differently in the "same" chemical process. As the Examiner has required, such a showing was submitted in response to the Official Action dated November 17, 1994.

The Examiner has alleged "that the instantly claimed process is only involved with the simple reaction between HF and vinyl chloride to produce 1-chloro-1-fluoroethane and/or 1,1-difluoroethane." It is unclear what thermodynamic and

kinetic information (e.g. the chemical equilibria involved) the Examiner relies upon to support his conclusion with respect to "the simple reaction ...." The Examiner is therefore invited to submit his Declaration in accordance with 37 CFR 1.107(b) in order that he may share his information with the applicants. In the absence of the Examiner's Declaration, there is absolutely no **evidence** of record that the reaction between HF and vinyl chloride to produce 1-chloro-1-fluoroethane and/or 1,1-difluoroethane is a "simple reaction."

As to the alleged consistency of the reaction results, applicants respectfully submit that quite different chemical equilibria are involved in the two processes. In particular, in the presently claimed process, the parallel reactions of vinyl chloride and 1-chloro-1-fluoroethane with ClH produced, leading to 1,1-dichloroethane, are far more important than similar reactions of vinylidene chloride and 1,1-dichloro-1-fluoroethane with ClH, **which would lead to 1,1,1-trichloroethane** in the Walraevens process.

Walraevens describes a process for the manufacture of 1-chloro-1,1-difluoroethane from vinylidene chloride by reaction with hydrogen fluoride (column 1, lines 14 to 16). By-products of this reaction include 1,1,1-trifluoroethane as well as 1,1-dichloro-1-fluoroethane, vinylidene chloride, and 1,1,1-trichloroethane (see column 4, lines 5 to 8). The

entire disclosure of Walraevens is concerned with a process using **vinylidene chloride** as the starting material. There is no description or suggestion in Walraevens that any other starting material could be used, with a reasonable likelihood of success. In sharp contrast to Walraevens et al., the present process uses a different starting material, namely vinyl chloride ( $\text{CH}_2=\text{CHCl}$ ) instead of vinylidene chloride ( $\text{CH}_2=\text{CCl}_2$ ), which obviously lead to different products.

The process set forth in claim 11 above, further differs from the disclosure of Walraevens et al. in the use of a different organic solvent, namely at least one saturated halogen-containing hydrocarbon selected from the group consisting of 1-chloro-1-fluoroethane, 1,1-difluoroethane, 1,1-dichloroethane, and compounds containing from 4 to 8 carbon atoms, for example 1,3-dichloro-1-fluorobutane. In sharp contrast, the Walraevens disclosure requires a liquid medium containing 1,1-dichloro-1-fluoroethane.

As to the "analogy" of the starting materials, beyond the structural analogy between vinyl chloride and vinylidene chloride, applicants note that these materials have well known **very different** reactivities. Vinyl chloride is far more reactive than vinylidene chloride, and thus has a far greater tendency than vinylidene chloride to form "heavies" by oligomerization.

Rao discloses the structural analogy between vinyl chloride and vinylidene chloride. **Rao contains no examples using vinyl chloride or vinylidene chloride as a starting material.** No conclusion concerning their respective behavior in the Rao process can thus be gleaned from the published application and, fortiori, no conclusion concerning the alleged analogy between these two compounds can be reached.

At page 4 of the Official Action the Examiner states: "[T]he instant rejection is not predicated on the assumption that vinyl chloride and vinylidene chloride are identical reactants but only that there would have been a reasonable expectation that **some useful analogous product** would be obtained." The present invention does not contain claims to "some useful analogous product," but provides a highly efficient process for the preparation of 1-chloro-1-fluoroethane and/or 1,1-difluoroethane starting from vinyl chloride and, at the same time, avoiding the unwanted formation of heavy halogen-containing side products. The Examiner's reasoning set forth in the last paragraph at page 2 of the Official Action is a clear statement of the improper "obvious-to-try" standard. There is, in fact, no suggestion in Walraevens that any other starting material could be used in place of vinyl chloride with a reasonable likelihood of success in avoiding the unwanted formation of heavy halogen-containing side products. This is particularly true when the

starting material is vinyl chloride which, as **vid nced** in the Declaration filed March 24, 1995, is more highly reactive than vinyl chloride and thus has a far higher tendency to form heavy halogen-containing side products than vinyl chloride (see the paragraph spanning pages 2 and 3 of the Declaration). Applicants respectfully submit that the Examiner has totally disregarded the **evidence** of record concerning the different behavior of vinyl chloride and vinylidene chloride. Applicants respectfully submit that the Examiner's argument about the motivation to use vinyl chloride instead of vinylidene chloride is based on pure speculation and unfounded assumptions. In particular, it is unclear why a person of ordinary skill in the art, aware of the **evidence** in the present application, would expect that vinyl chloride and vinylidene chloride would exhibit "similar behavior when reacted with HF" since the **evidence** shows that they behave differently when reacted with HF. Applicants therefore respectfully submit that a person of ordinary skill in the art would not find the subject matter of the rejected claims obvious in view of the cited references. Applicants respectfully request the Examiner to reconsider and withdraw the rejection of the claims under Section 103.

For the reasons discussed, and in view of the above amendments, applicants respectfully submit that their application is now in condition for allowance. The Examiner

is respectfully requested to call the undersigned attorney if  
any minor matter remains.

Respectfully submitted,



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